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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/091,485	03/07/2002	Laure S. Mittelstadt	10015155-1	9468

7590 05/28/2004

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EXAMINER

YUAN, DAH WEI D

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 05/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.	Applicant(s)	
10/091,485	MITTELSTADT ET AL.	
Examiner	Art Unit	
Dah-Wei D. Yuan	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.135(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 and 47-50 is/are pending in the application.
- 4a) Of the above claim(s) 11-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 47-50 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date 02182004
- 4) ☐ Interview Summary (PTO-413)  
 Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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**ION EXCHANGE SYSTEM STRUCTURE WITH A MICROTEXTURED SURFACE,  
METHOD OF MANUFACTURE, AND METHOD OF USE THEREOF**

Examiner: Yuan

S.N. 10/091,485

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May 24, 2004

**Detailed Action**

1. The Applicant's amendment filed on April 22, 2004 was received. Claims 20-46 were cancelled. Claims 1,2 were amended. Claims 47-50 were added.
2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action issued on January 20, 2004.

***Claim Rejections - 35 USC § 112***

3. The claim rejections under 35 U.S.C. 112, second paragraph, on claim 2 are withdrawn, because the claim has been amended.

***Claim Rejections - 35 USC § 102***

4. The claim rejections under 35 U.S.C. 102(b) as anticipated by Spear, Jr. et al. on claims 1-3 are withdrawn, because the independent claim 1 has been amended.
5. Claims 1-10,47-50 are rejected under 35 U.S.C. 102(e) as being anticipated by Ruhl et al. (US 6,361,892 B1).

With respect to claims 1-3, Ruhl et al. teach a solid oxide fuel cell system comprising a solid electrolyte disposed between an oxygen electrode and a fuel electrode. Micro-channels

(26) may be fabricated into the surface of electrode (13), electrolyte (10) or separator (6) by a variety of conventional subtractive techniques including laser ablation. Material can be removed from the surface of one of the layers to provide the microchannel. See Abstract; Column 6, Lines 42-49; Column 8, Lines 22-42.

With respect claims 4,5, the anode in the fuel cell preferably comprises either nickel felt or a finely divided compressed metallic powder such as nickel blended with a stable oxide powder such as zirconia. The cathode may comprise mixed ionic/electronic conductor such as an appropriately doped perovskite oxide. Thus, the laser irradiated surface of the electrode is coated with a layer of conductive material. See Column 6, Lines 17-31.

With respect to claims 6,7, Ruhl et al. further teach the cathode or the anode may comprise a mixed conductor, optionally combined with an electronically conducting material. Examples include ceria, which can be doped with an oxide of lanthanum, zirconium or thorium, optionally containing an electronically conducting phase such as Co, Ru, or Pt. See Column 6, Lines 17-31.

With respect to claims 8,9, a paint or ink containing substantially anode material such as nickel (catalytic material) or nickel oxide may be applied to the surface of the electrolyte adjacent the anode to form the electrical contact. Column 6, Lines 1-7.

With respect to claim 10, the substrate further comprises fuel holes (18), which provide fuel to reach the catalytic material. See Column 7, Lines 38-52.

With respect to claims 47-50, Ruhl et al. do not specifically disclose surface feature and scale of roughness in the resulting electrode that is irradiated by a laser ablation. However, it is

the position of the examiner that such properties are inherent, given that both Ruhl et al. and the present application utilize similar laser forming process. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference*. In re Robertson, 49 USPQ2d 1949 (1999).

6. Claims 1-3,8,9,47-50 are rejected under 35 U.S.C. 102(e) as being anticipated by Shastri et al. (US 6,471,993 B1).

With respect to claims 1-3, Shastri et al. teach a porous polymer matrices, such as membranes, macroporous solids, and cellular solids, that are used in a wide variety of applications. Matrices including carbon powder, graphite powder, graphite fibers, metal powders, or metal fibers are useful in the production of porous electrode and/or solid-state electrolytes for battery and fuel cell applications. The porous polymer matrices may be formed by various methods, including laser ablation. See Column 1, Lines 20-25; Column 16, Lines 52-57; Column 23, Lines 1-9; Column 26, Lines 13-18.

With respect to claims 8,9, Shastri et al. teach catalysts can be incorporated into the polymer matrices. These catalysts can be inorganic and organometallic catalysts including aluminum catalysts, nickel catalysts and zinc catalysts.

With respect to claims 47-50, Shastri et al. do not specifically disclose surface feature and scale of roughness in the resulting electrode that is irradiated by a laser ablation. However, it is the position of the examiner that such properties are inherent, given that both Shastri et al. and the present application utilize similar laser forming process. A reference which is silent about a

claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference*. In re Robertson, 49 USPQ2d 1949 (1999).

***Response to Arguments***

7. Applicant's arguments filed on April 22, 2004 have been fully considered but they are not persuasive.

*Applicant's principle arguments are*

*(a) Ruhl et al. is not concerned with the reactive surface area nor is he concerned with altering the surface area of a reactive surface of a fuel cell;*

*(b) Shastri et al. only teach the voids or interior surface of the polymer matrix is formed by precipitation. In contrast, claim 1 teaches an exterior surface roughened by laser ablation.*

In response to Applicant's arguments, please consider the following comments.

(a) Ruhl et al. teach micro-channels (26) may be formed within electrode (13). See Figures 3 and 4. These micro-channels create a preferential path for reactant flow across the electrode. The micro-channels may be fabricated into the surface of the electrode by a variety of techniques including laser ablation. See Column 8, Lines 22-26;

(b) Shastri et al. teach matrices including carbon powder, graphite powder, graphite fibers, metal powders, or metal fibers are useful as porous electrode and/or solid state electrolytes for fuel cell applications. The porous polymer matrices, including exterior surface,

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can be shaped by methods known to those of skill in the art for shaping solid objections, including laser ablation. See Column 16, Lines 49-57; Column 23, Lines 1-9.

***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dah-Wei D. Yuan whose telephone number is (571) 272-1295. The examiner can normally be reached on Monday-Friday (8:00-5:00).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dah-Wei D. Yuan  
May 24, 2004

